THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of treating ore particles to facilitate subsequent processing of the ore particles to recover valuable components from the ore, including: exposing the ore particles to microwave energy and causing structural alteration of the ore particles without significantly altering the mineralogy, ie composition, of the ore, the structural alteration of the ore particles being a result of differences in thermal expansion of minerals within ore particles, as a consequence of exposure to microwave energy, resulting in regions of high stress/strain within the ore particles and leading to micro-cracking or other physical changes within the ore particles.

2. The method defined in claim 1 includes exposing the ore particles to microwave energy and causing structural alteration of the ore particles without catastrophic destruction of the ore particles.

3. The method defined in claim 1 or claim 2 includes screening the ore particles prior to exposing the ore particles to microwave energy in order to provide a preferred particle size distribution for subsequent microwave energy treatment.

4. The method defined in any one of the preceding claims includes screening the ore particles prior to exposing the ore particles to microwave energy in order to remove fines from the ore particles.

5. The method defined in any one of the preceding claims includes exposing the ore particles to pulses of microwave energy.

6. The method defined in claim 5 wherein the microwave energy within the pulses has high energy to give

rapid heating of susceptor minerals in the ore.

7. The method defined in claim 5 or claim 6 wherein the pulses of microwave energy includes pulses of short duration.

8. The method defined in claim 7 wherein the time period of each pulse is less than 1 second.

9. The method defined in claim 8 wherein the pulse time period is less than 0.1 second.

10. The method defined in claim 9 wherein the pulse time period is less than 0.001 second.

11. The method defined in any one of the preceding claims wherein the ore particles include microwave susceptor and non-susceptor components and the valuable components in the ore are metals and the metals are part of the microwave susceptor components of the ores.

12. The method defined in any one of the preceding claims wherein the ore is an ore in which the valuable components are metals and the metals are present as a sulphide.

13. The method defined in claim 12 wherein the ore is a copper-containing ore in which the copper is present as a sulphide, such as chalcopyrite or chalcocite.

14. The method defined in claim 12 wherein the ore is a nickel-containing ore in which the nickel is present as a sulphide.

15. The method defined in claim 12 wherein the ore is a uranium-containing ore.

16. The method defined in any one of claims 1 to 11 wherein the ore is an ore in which the valuable components are iron and the ore contains iron minerals where some of the iron minerals have disproportionately higher levels of unwanted impurities.

17. The method defined in any one of claims 1 to 11 wherein the ore is a diamond ore and the ore has a mix of diamond containing minerals and diamond barren minerals such as quartz.

18. The method defined in any one of the preceding claims wherein the ore particles have a major dimension of 15 cm or less prior to exposure to microwave energy.

19. The method defined in any one of the preceding claims includes transporting the ore to an inlet end of the transfer chute on a conveyor and transporting the microwave-treated ore from an outlet end of the transfer chute on a conveyor.

20. A method of treating ore particles to facilitate subsequent processing of the ore particles to recover valuable components from the ore, including: exposing the ore particles to microwave energy and causing structural alteration of the particles without catastrophic break down of the particles, the structural alteration of the ore particles being a result of differences in thermal expansion of minerals within ore particles, as a consequence of exposure to microwave energy, resulting in regions of high stress/strain within the ore particles and leading to micro-cracking or other physical changes within the ore particles.

21. A method of treating ore particles to facilitate subsequent processing of the ore particles to recover valuable components from the ore, including: exposing the

ore particles to pulses of microwave energy and causing structural alteration of the particles, the structural alteration of the ore particles being a result of differences in thermal expansion of minerals within ore particles, as a consequence of exposure to microwave energy, resulting in regions of high stress/strain within the ore particles and leading to micro-cracking or other physical changes within the ore particles.

22. The method defined in claim 21 wherein the microwave energy within the pulses has high energy to give rapid heating of susceptor minerals in the ore.

23. The method defined in claim 21 or claim 22 wherein the pulsed microwave energy includes pulses of short duration and high energy.

24. The method defined in claim 23 wherein the time period of each pulse is less than 1 second.

25. The method defined in claim 24 wherein the pulse time period is less than 0.1 second.

26. The method defined in claim 25 wherein the pulse time period is less than 0.001 second.

27. A method of recovering valuable metals from an ore including the steps of:

(a) treating ore particles by the exposing ore particles to microwave energy and causing structural alteration of the particles, the structural alteration of the ore particles being a result of differences in thermal expansion of minerals within ore particles, as a consequence of exposure to microwave energy, resulting in regions of high stress/strain within the ore particles and leading to micro-cracking or other physical changes within

the ore particles; and

(b) processing the treated ore particles to recover valuable metals.